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THE NEED FOR PESTICIDES

Pesticides, along with fertilizers, machinery, genetically improved varieties, irrigation, and improved management practices, have made agricultural production in the United States today the most efficient and productive ever known to man. The nation's food and fiber needs are now being met by only a small portion of the total work force of the Nation, thus freeing much of the manpower needed to provide other goods and services that contribute to our high standard of living. This would not be possible without pesticides to control many of the estimated 10,000 species of harmful insects, more than 1,500 diseases caused by fungi, 1,800 different weeds that cause serious economic losses, and about 1,500 nematodes that cause damage to crop plants.

The use of pesticides has also allowed us to reduce the incidence of insect-transmitted diseases, such as malaria, yellow fever, encephalitis, and others to the point where they are no longer considered serious health problems in many parts of the world. Were it not for the use of pesticides, the prospects for mass starvation and widespread occurrence of agonizing and lethal diseases would be far greater than they are today.

The use of pesticides has accounted for at least 20 percent of the increase in farm output since 1940. They are also responsible for \$3 billion of the annual savings in production resources. If complete withdrawal of pesticides now used in agricultural production were to happen, farm exports would be eliminated. The number of agricultural workers currently on farms would have to be doubled. Without increasing the amount of land in farm crops, we could not provide food for more than 40 percent of our current population.

Some examples follow that show how the use of pesticides has helped to create an agricultural revolution.

Increase Crop Yields

One of the most important benefits from pesticide chemicals is an ample supply of wholesome food. Since the early 1940's, when chemical pesticides came into popular use on the Nation's farms, the yield per acre of major crops in the United States has had a spectacular increase.

Records of wheat production in Great Britain show that yields increased from 500 pounds per acre in 1100 A.D. to about 1,500 pounds in 1900 A.D., a period of 800 years. Within the last 30 years, the yields have almost doubled and reached an average of 3,000 pounds per acre.

Between 1870 and 1939, the average yields of corn in the United States remained essentially constant at about 25 bushels per acre. Since 1940, the average yield has increased about 3 times to 89 bushels per acre in 1971.

Potato yields in the United States rose from 133 bushels per acre in 1940 to 213 bushels per acre in 1968. Egg production in Arizona increased from 166 eggs per year per laying hen in 1934 to 237 in 1969; at the same time, the pounds of feed required to produce one dozen eggs decreased from 5.04 to 4.11.

The preceding examples show that pesticides, along with other technology, are essential if food, feed, and fiber production is to be maintained and increased to meet national and world needs. The relations between pesticide usage and crop yields in various areas and countries are shown in the table. Pesticides are used extensively in countries whose sources of food are adequate. Generally, the countries that use more ounces of pesticides per acre also have the highest production. India and Africa would need to increase the use of pesticides 70 to 80 times the present use in order to increase yields by 4.5 to 6.5 times the present yields.

Areas and nations ranked in order of pesticide
usage per acre and in order of yields of major crops.

Area or nation	Pesticide use		Yields	
	ounces/A	Rank	lb/A	Rank
Japan	154.0	1	4,890	1
Europe	26.7	2	3,060	2
United States	21.3	3	2,320	3
Latin America	3.1	4	1,760	4
Oceania	2.8	5	1,400	5
India	2.1	6	730	7
Africa	1.8	7	1,080	6

Ample food production pays other dividends besides that of satisfying domestic needs. Ample food supplies and modern food production technology are powerful weapons for peace. Agricultural products are critically important in foreign trade and for aid to the hungry people of developing countries.

Conserve Energy and Land Use

Weed killers (herbicides) have had a big impact on mechanized farming. Herbicides differ from other pesticides in that they can be used to reduce labor and power requirements in crop production. In effect, herbicides represent a substitute for other sources of energy for increasing farming efficiency.

Pesticides make it possible to put millions of acres to other uses, simply because it is not necessary to grow crops there in order to make up for goods that would be destroyed by insects, diseases, rodents, and other pests if such protection were unavailable. For centuries, insects have destroyed stored grains. The struggle to preserve products against the ravages of rodents, insects, diseases, and even certain birds is incessant.

Protect Structures

We are familiar with the damage from those fungi that cause the deterioration of telephone and electric poles, fence posts, railroad ties, wooden bridges, and dock pilings. These are now treated with fungicides that prevent such deterioration. Many wooden buildings are treated with chemicals to prevent onslaughts by termites and the destructive, wood-rotting fungi. An estimated 600 million cubic feet of wood are treated annually in the United States alone. Assuming that preservatives make wood last 50 years on average, as compared to perhaps 10 years if it remains untreated, it can be said that this process conserves 480 million cubic feet of wood per year.

Control Insects that Carry Human Diseases

The control of malaria through the use of pesticide chemicals is one of the truly remarkable achievements of mankind. The seriousness of this debilitating disease, which has contributed so much to the misery and backwardness of whole nations, has now been reduced almost everywhere by its essential eradication.

Thousands of people still fall prey to mosquito-borne encephalitis for which there is no cure or specific treatment. The only current method of controlling this dreaded disease is to prevent mosquitoes from breeding or to use insecticides for control.

Insect-borne filariasis, typhus, African sleeping sickness, and bubonic plague still bring sickness and death to thousands; insecticides and other control measures are essential to check these diseases. However, the control of human disease increases the need for pesticides in agriculture and food storage; otherwise, those who escape malaria or typhus may die of starvation or malnutrition. Although disease control undoubtedly results in a higher level of production efficiency, the net effect of this use of pesticides is an increased demand for food.

Herbicides also play an important role in bringing disease-transmitting pests under control. For example, a pilot program was conducted in Africa to eradicate the tsetse fly, which carries the dreaded sleeping sickness. Recent findings indicate that the best possibilities may lie in integrated control programs involving the use of herbicides to reduce growth of the brush so essential to the fly's survival, insecticides to minimize the fly population, and the release of sterile males for biological control.

Poison ivy, poison oak, ragweed, and other weeds produce toxins and allergenic pollens. In the United States, poison ivy and poison oak cause nearly 2 million cases of skin poisoning and other skin irritations annually, for a loss of 333,000 working days. In addition, these weeds cause 3.7 million days of restricted activity among those people who are susceptible to the toxins. The reduced working efficiencies that are due to all weed and plant allergies are undoubtedly many times greater. Modern herbicides are needed to keep these allergenic-producing plants under control.

Improve Our Environment

Pesticides have resulted in a wide range of other benefits to the public. Many of these, such as the control of unsightly weeds in lawns or the protection of ornamentals from insects and diseases, are aesthetic. Some pesticides insure the health and comfort of our pets. Others control flying or crawling insects in or near living quarters and thereby add to our comfort. Pesticides reduce the possibility of our contracting a disease that is transmitted by an insect or tick. Our recreational areas have been improved by the control of unwanted vegetation. Managed preserves for wildlife and fishing areas have been improved by use of vegetation-control chemicals to produce more favorable sites.

Chemicals closely related to those used in agriculture are used to control trash fish and other pests such as the sea lamprey in the Great Lakes. Improved water flow has been obtained by the use of herbicides to control vegetation that is the cause of flooding.

Prudent and judicious use of pesticides will be required for many years to maintain our agricultural production at levels needed to feed our everexpanding population and to maintain or improve the present public health standards. It is the policy of the Department of Agriculture to practice and encourage the use of those means of practicable, effective pest control that result in maximal protection against pests and the least potential hazard to man, his animals, wildlife, and other components of the natural environment.